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Alexandria Metal Finishers

Over 60 Years of Quality Metal Finishing

1962 - 2025

| PROCESS | SPEC | THICKNESS | COMMENTS |
|--|----------------------------|--|--|
| ANODIZE SULFURIC | MIL-PRF-8625 MIL-A-8625 | | |
| Color will vary with alloy. Aluminum will show practically no color change. Best coating on aluminum for dyeing. Can be dyed practically any color or shade (Black, blue, red, gold, orange, green, etc.). | Type II | 0.000070" - 0.0010" | All aluminum alloys, but do not use where solution will entrap. |
| Salt spray requirement is 336 hours (5% NaCl solution) per method B-117 of ASTM. | Type IIB | Light Coating | Thin coating use as a non-chromate alternative for Type I, chromic acid anodize. |
| | Class 1 | | Non-dyed |
| | Class 2 | | Dyed For Class 1, Alexandria's standard practice for sealing is "Clear, hot DI water". Dichromate seal may be specified (resulting color will be pale yellow-green). FED-STD No. 595 may be used as a guide for specifying color (approximate comparison only). |
| ANODIZE TO AEROSPACE MATERIAL SPECIFICATIONS (AMS) | | | |
| AMS anodizing specifications are similar to MIL-A-8625. The major differences are in the testing requirements. All AMS specs do not allow production parts to be run until preproduction samples have been approved or waived in writing by purchaser. Coating weight test may be required on a lot basis rather than a monthly basis. Additional and/or specific tests may be required. | AMS-2469 | Hardcoat: 0.002" ± 0.0005" | Salt Spray test is requirement (when sealed) for 336 hours |
| *** AMS 2471/2472/2482 are not currently included in our Nadcap scope. | AMS-2471 | Sulfuric Acid Process - no dye coating | 336 hours salt spray test required and controlled on 6061 - T3 aluminum. (Dichromate Sealed) |
| | AMS-2472 | Sulfuric Acid dye Black | 336 hours salt spray test required and controlled on 6061 - T3 aluminum. |
| | AMS-2482 | Hardcoat: 0.002" ± 0.0005" with Teflon | 336 hours salt spray test required. Coefficient of friction test required. |
| CHEMICAL FILM | MIL-DTL-5541 | | |
| Coatings for aluminum. Color can vary from colorless to golden - iridescent brown. Materials should conform to MIL-DTL-6706. Coatings shall be continuous, free from powdery areas, breaks, scratches, etc. | Class 1 A | No Dimensional Change | Class 1A is used as a corrosion preventative film (if unpainted) or to improve adhesion of paint finish systems (if painted). |
| Type II Yellow or Clear Chromate. Type II Clear (RMS compliant Hex-free, Cl. 1A or 3) | Class 3 | | Class 3 is used as a corrosion preventative film for electrical and electronic applications, where low resistance contacts are required. Low electrical resistance test not required unless specified. |
| CHEMICAL FINISH (Black) | MIL-F-485 | | |
| A uniform black corrosion retardant for copper. Coating has no abrasion resistance. | | No Dimensional Change | Used as a base for lacquer, light oil, or wax. For decorative, optical, and corrosion retardant application |



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| COPPER | MIL-C-14550 | | |
| Copper in color and matte to a very shiny finish. Good corrosion resistance when used as undercoat. A number of copper processes are available, each design for a specific purpose: Brightness: To eliminate the need for buffing High speed: For electroforming Fine grain: To prevent casehardening Please note: This specification is provided for reference only, as it has been superseded by AMS-2418 (See below). | Unless otherwise specified: Class 0 0.001 - 0.0005" Class 1 0.001" min. Class 2 0.0005" min. Class 3 0.0002" min Class 4 0.0001" min. | For heat treatment stop-off For carburizing and decarburizing shield, also plated through printed circuit board As an undercoat for nickel and other platings. ➤ to prevent basis metal migration into tin (prevent poisoning solderability). | |
| COPPER | AMS-2418 | | |
| Alternate spec. to supersede MIL-C-14550 | Unless otherwise specified: 0.0005" - 0.0007" | Copper flash about 0.0001" Preproduction approval required or must be waived in writing. | |
| ELECTROLESS NICKEL | AMS-C-26074 (MIL-C-26074) | | |
| Similar to stainless steel in color. Plates uniformly in recesses and cavities (does not build up on edges). Corrosion resistance is good for coating over 0.001" thickness. Electroless nickel is used extensively in salvage of mismatched parts. Also, for inside dimensions and irregular shapes (where assembly tolerances need uniformity provided by electroless process). This spec does not specify the phosphorous content in the EN deposit; provided it passes 100 hours salt test at 1.0 mil for AL and 1.5 mil for steel. Microsectioning to determine coating thickness may be required under this spec when thickness is over 1 mil and non-destructive test method is not available. | Unless otherwise specified: Class 1 Class 2 Class 3 Class 4 Grade A 0.0010" min. Grade B 0.0005" min. Grade C 0.0015" min. | Customer to specify the Rc hardness of steel and if it is greater than Rc40, whether the steel is carburized. As Coated Steel and other base metals heat treatable to improve hardness. Aluminum alloy, not heat treatable, processed to improve adhesion of nickel deposit. Aluminum alloy, heat treatable, processed to improve adhesion of nickel deposit. Unless otherwise specified: Aluminum alloys will be Grade A. Cu, Ni, Co alloys will be Grade B. Ferrous alloys will be Grade C. | |
| | For plating on titanium alloys, customer to supply titanium coupons for adhesion testing. | | |
| ELECTROLESS NICKEL | AMS-2404 | | |
| No definition of phosphorous content in the EN deposit. No "Grade" designation. Plating on special metals such as titanium, etc. requires customer to supply test coupons of identical material to be used for plating adhesion tests. | As specified on Drawings Class 1 Class 2 Class 3 Class 4 | Note: Unless a specific class is specified, Class 1 shall be supplied. Except for hydrogen embrittlement relief, no postplating thermal treatment. Thermal treatment at 235°F (232°C) or above to harden the deposit, hardness to 800 HK min. Thermal treatment at 375°F (191°C) to improve adhesion for non heat-treatable aluminum and beryllium alloys. Thermal treatment at 250°F (121°C) to improve adhesion for heat-treatable aluminum alloys. | |
| Specs require the EN to pass 48 hours salt spray test for steel (at 1.0 mil min.) Specifications require no production parts, unless preproduction samples have been approved or waived in writing by purchaser. EN deposit may be hardened by heating at 750° F for steel, but only when specified. | | | |

| JANUARY | | | | | | |
|---------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

| APRIL | | | | | | |
|-------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | | | |

| JULY | | | | | | |
|------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

| OCTOBER | | | | | | |
|---------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

| FEBRUARY | | | | | | |
|----------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | |

| MAY | | | | | | |
|-----|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

| AUGUST | | | | | | |
|--------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

| NOVEMBER | | | | | | |
|----------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |

| MARCH | | | | | | |
|-------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |

| JUNE | | | | | | |
|------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

| SEPTEMBER | | | | | | |
|-----------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

| DECEMBER | | | | | | |
|----------|-----|-----|-----|------|-----|-----|
| SUN | MON | TUE | WED | THUR | FRI | SAT |
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

| PROCESS | SPEC | TEMPERATURE/ TIME | COMMENTS |
|---|------------|--------------------|---|
| PASSIVATE | ASTM-A-967 | | |
| Alternate spec to supersede QQ-P-35. In addition to passivate using Nickel acid (and Sodium Dichromate), Alexandria Metal Finishers currently offers Nitric 1 and Nitric 2 passivation. For any other types, please contact for consultation. | Nitric 1 | 120°-130°F 20 min. | Nitric Acid (Vol. %) 20 - 25 Sodium Dichromate (Weight %) 2.5 ± 0.5 |
| | Nitric 2 | 70°-80°F 30 min. | 20 - 45 none |
| | Nitric 3 | 120°-140°F 20 min. | 20 - 25 none |
| | Nitric 4 | 120°-130°F 30 min. | 45 - 55 none |
| | Nitric 5 | As required | As required to pass test |

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| RHODIUM | MIL-R-46085 | THICKNESS | |
| Metallic and similar to stainless steel in color. Excellent corrosion resistance. Almost as hard as chromium. Very good abrasion resistance. Excellent solderability. Low contact resistance. Thicker coatings are very brittle. Has high reflectivity. Inactive for new design. Provided for reference. | Type I | ----- | Over Nickel, Silver, Gold, or Platinum |
| | Type II | ----- | Over other metals (require Nickel Undercoat) |
| | Class 1 | 0.000002" min. | Used on Silver for tarnish resistance. Applications range from electronic to nose cones wherever wear, corrosion resistance, solderability, and reflectivity are important |
| | Class 2 | 0.00001" min. | |
| | Class 3 | 0.00002" min. | |
| | Class 4 | 0.00010" min. | |
| | Class 5 | 0.00005" min. | |

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| SILVER | QQ-S-365 | | |
| Whita matte to very bright in appearance. Good corrosion resistance, depending on base metal. Will tarnish easily. Hardness varies from about 90 Brinell about 135 Brinell depending on process and plating conditions. Solderability is excellent, but decreases with age. Best electrical conductor. Has excellent lubricity and smearing characteristics for anti-galling uses on static seals, bushings, etc. This specification is provided for reference purposes only as it has been cancelled. Users may consult ASTM-B-700 (see below). | Type I | 0.0005" min. unless otherwise specified for most metals. For Fe Alloys, unless otherwise specified, it shall be 0.0005" min. of silver with a total plating thickness of 0.0005" min. (the balance to be Cu + Ni, but should not exceed 0.0005") | Increasing use in both decorative and engineering fields, including electrical and electronics fields. Matte Semi-Bright Bright Chromate post treatment to improve tarnish resistance* * (Lot test required) |
| | Type II | | |
| | Type III | | |
| | Grade A | | |
| | Grade B | | |

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| SILVER | ASTM-B-700 | | |
| This specification covers requirements for electroplated coatings of silver used for engineering purposes that may be matte, bright, or semibright and are not less than 98% silver purity. Bi yearly analysis of purity of deposited silver required. Tarnish resistance test not required. | Type I | ----- | 99.9% min. |
| | Type II | ----- | 99.0% min. |
| | Type III | ----- | 98.0 % min. |
| | Grade A | | Matte |
| | Grade B | | Bright (obtained by using Brighteners) |
| | Grade C | | Bright (obtained by polishing of Grade A coatings) |
| | Grade D | | Semibright (obtained by the use of addition agents) |
| | Class N | | No supplementary tarnish resist (Chromate) treatment |
| | Class S | | With supplementary tarnish resist (Chromate) treatment (not suitable for food service applications) |
| | Class T | As Specified (ref. Table 3.1) | Supplementary Non-Chromate Tarnish Resist. |

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| SULFAMATE NICKEL | MIL-P-27418 | | |
| The plating conforming to this specification is intended to facilitate the formation of a seal between two metallic surfaces. PLATING HARDNESS: Not to exceed 150 Knoop hardness (500 gm. load) after annealing, (or 300 Knoop before annealing) inactive specification per notice 3. MIL-P-27418 is not currently included in our Nadcap scope. If Nadcap is a requirement, AMS 2403 and AMS-QQ-N-290 may be used for Sulfamate Nickel, specifically. | See Comments | Unless otherwise specified: 0.0002" ± 0.0003" on all surfaces that can be touched by 0.0625" Dia. Ball. | The nickel plating shall have columnar crystalline structure before annealing. Unless otherwise specified, the bath shall be chloride free. Certification to this spec is available only when specific waivers / clarifications / deviations are received from the customer (i.e. hardness, thickness, bath, composition, etc.) |
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| TIN | MIL-T-10727 | | |
| Color is gray-white in a plated condition. Has a very high luster in used condition. Soft and very ductile. Corrosion resistance is good. Plated item should meet 4 hour 5% salt spray requirement. Solderability is excellent. Tin is not good for low temperature applications (changes structure and causes adhesion when exposed to temperature below -40°C). Plate directly on steel substrates or undercoating for steel unless otherwise specified. Please Note: This specification is provided for reference purposes only as it has been superseded by ASTM-B-545 (see below) and ASTM-B-389 (not available at Alexandria Metal Finishers). | Type I | ----- | Electrodeposited. Use ASTM-B-545 as guideline. Flash for soldering |
| | | 0.0001 - 0.00025" | To prevent galling and seizing |
| | | 0.0003 min. | Where corrosion resistance is important |
| | | 0.0002 - 0.0006" | To prevent formation of case hardening during nitriding. |
| | Type II | ----- | Hot dipped (not currently available at Alexandria Metal Finishers) |

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| TIN | ASTM-B-545 | | |
| ASTM requires purchaser to supply information: base metal, underplating, test requirements, test methods, etc. In general, copper alloys containing more than 5% Zn shall have a copper undercoating of at least 0.0001", optional electrodeposited lead in the range of 2-12% may be specified | Class A | 0.0001" min. | |
| | Class B | 0.0002" min. | |
| | Class C | 0.00032" min. | 0.0004" min. for steel |
| | Class D | 0.0006" min. | 0.0008" min. for steel |
| | Class E | 0.0012" min. | |
| | Type Matte | | |
| | Type Bright | | |
| | Type Flow Brightened | | Flow brightening not currently available at Alexandria Metal Finishers. |

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| TIN LEAD | AMS-P-81728 | | |
| Alexandria Metal Finishers offers a matte finish. Has excellent solderability. 0.0002" copper plate generally required on copper base alloys. No undercoating required on steel substrates unless specified. | Unless Otherwise specified: 0.0003" - 0.0005" | | |
| The MIL-P-81728 specification has been superseded by the AMS-P-81728 specification. | Standard composition 50/40 Sn-Pb | 50% - 70% Tin, remainder is Lead | |
| | Optional composition 90/10 Sn-Pb | Nominal 88% 97% Tin, remainder is Lead | |

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| ZINC | ASTM-B-633 | | |
| Either a bright or dull finish is acceptable. Bright zinc plating closely resembles bright chromium. However, bright zinc does not have the permanence of surface appearance. Zinc coated steel will not rust even when exposed by scratches because of the sacrificial protection of the zinc. On weathering, zinc turns to a drab gray color. Zinc should be deposited directly on the base metal (Nickel is permitted undercoat if base metal is a corrosion resisting steel). Parts having a hardness above 21 HRC shall be pre- and post-baked (AMS-2403 and AMS-B-850). Purchaser is responsible for the selection of bake temperature and duration. If bakes are not required, it shall be stated on PO or drawing. | Fe/ZnB5 SC4 (very severe) Fe/Zn12 SC3 (severe) Fe/ZnB SC2 (moderate) Fe/Zn5 SC1 (mild) Type I Type II Type III | 0.0010" min. 0.00050" min. 0.00030" min. 0.00020" min. | The primary use of chromate finishes on zinc is to retard or prevent formation of white corrosion products on zinc surfaces. The primary purpose of phosphate coating on zinc is to provide a point base. We currently offer only chromate. Without supplementary treatment. With supplementary chromate treatment. Corrosion resistance requirements: Type II 96 hours Type III 12 hours |
| *Types IV, V and VI not available at Alexandria Metal Finishers. | | | |

Anodizing, Electroplating, Chemical Finishing

| PROCESS | SPEC | THICKNESS | COMMENTS |
|--|-------------------------------|---|---|
| ELECTROLESS NICKEL | ASTM-B-733 | | |
| 3 - 13% phosphorous EN deposit. Alexandria Metal Finishers offers electroless nickel plating with a phosphorous range of 8-12%. More stringent, specific and detailed than MIL-C-26074, AMS-2404 & AMS-2405. Ordering data must be complete. Plating on special metals such as titanium, etc. requires customer to supply test coupons of identical material to be used for plating adhesion tests. | | Range from 0.00004" - 0.003" | ASTM specification requires the purchaser to well define the "type", "class", "service condition", "composition", "test method", etc. on ordering documents. Porosity testing is offered when requested on purchasing documents. The customer must specify testing method and requirements. |
| ELECTROPOLISHING | NO MIL SPEC | | |
| Process electrolytically removes or diminishes scratches, burrs and unwanted sharp edges from most 300 series stainless steel alloys. Finishes from satin to mirror-bright are produced by controlling time, temperature, or both. | | Typical material removal: 0.0002" | Typical dimensional reduction of 0.0002" per surface. Process is not recommended for close tolerance surfaces. |
| GOLD | MIL-G-45204 | | |
| Yellow to orange color depending on proprietary process used. Will range from matte to bright finish depending on basis metal. Good corrosion resistance, and has high tarnish resistance. Provides a low contact resistance, and is a good conductor. Has excellent solderability. | Type I Type II Type III | Unless otherwise specified: | |